

CLAIMS

1. A gas injection type soldering method, characterized in that after a reducing gas and an inert gas, which are supplied from gas supply sources separately, are mixed at a predetermined ratio by a mixer, a resultant mixed gas is made to a hot mixed gas by being heated by a heater so that the temperature of the mixed gas is increased and the mixed gas is dried by being dehumidified, the hot mixed gas is injected from an injection port formed in a soldering iron to a subject, and soldering is performed in the atmosphere of the mixed gas while preventing the oxidation of the subject by the inert gas in the mixed gas as well as reducing an oxide film by the reducing gas.

2. A soldering method according to claim 1, characterized in that the hot mixed gas is injected simultaneously also from a solder guide for feeding thread solder to the soldering iron.

3. A soldering method according to claim 1, characterized in that the reducing gas is a hydrogen gas, the inert gas is a nitrogen gas, and the ratio of the hydrogen gas in the mixed gas is 2 to 15%.

4. A gas injection type soldering apparatus, characterized by comprising a gas injection mechanism for injecting a mixed gas in which a reducing gas is mixed with an inert gas from an injection port to a subject and a soldering iron

for performing soldering by heating and melting solder, wherein the gas injection mechanism comprises flow regulators for individually regulating the flow rates of the reducing gas and the inert gas supplied from gas supply sources separately, a gas mixer for uniformly mixing the reducing gas and the inert gas supplied from the flow regulators, a gas heater for heating a mixed gas supplied from the gas mixer so as to dehumidify and dry it and to increase the temperature of the mixed gas, the injection port for injecting the heated hot mixed gas, and a controller capable of regulating the mixing ratio of the reducing gas and the inert gas by controlling the respective flow regulators.

5. A soldering apparatus according to claim 4, characterized in that the gas injection mechanism further comprises a concentration sensor for measuring the concentration of the gas in the vicinity of the subject and a safety circuit for restricting the supply of at least the reducing gas, when the value of concentration measured by the concentration sensor exceeds a set value, by controlling the flow regulators by the controller.

6. A soldering apparatus according to claim 4, characterized in that the reducing gas is a hydrogen gas and the inert gas is a nitrogen gas.

7. A soldering apparatus according to claim 4, comprises

a guide for feeding thread solder to the soldering iron, and the solder guide also acts as means for injecting the hot mixed gas.

8. A soldering apparatus according to claim 4, characterized in that the soldering iron is a contact type soldering iron and comprises a soldering iron main body in which a soldering iron heater is contained, a soldering iron tip for heating and melting solder, the injection port opened so as to surround the entire periphery of the soldering iron tip, and a gas flow path communicating with the injection port.

9. A soldering apparatus according to claim 8, characterized in that the temperature of the mixed gas is set to a temperature lower than that of the soldering iron tip when soldering is performed.

10. A soldering apparatus according to claim 4, characterized in that the soldering iron is a non-contact type soldering iron and has the injection port at the extreme end of the soldering iron, and soldering is performed by heating and melting solder by the heat of the mixed gas itself injected from the injection port in the atmosphere of the mixed gas.

11. A soldering apparatus according to claim 4, characterized in that the soldering iron is a laser type soldering iron and comprises a soldering iron main body for projecting a laser beam and the injection port also acting as the

projection port of the laser beam and that soldering is performed by projecting the laser beam to a subject in the jet stream of the mixed gas injected from the projection port.

12. A gas injection type soldering apparatus, characterized by comprising a gas injection mechanism for injecting a mixed gas in which a hydrogen gas is mixed with a nitrogen gas from an injection port to a subject and a soldering iron for performing soldering by heating and melting solder, wherein the gas injection mechanism comprises flow regulators for individually regulating the flow rates of the hydrogen gas and the nitrogen gas supplied from gas supply sources separately, a gas mixer for uniformly mixing the hydrogen gas and the nitrogen gas supplied from the flow regulators, a gas heater for heating a mixed gas supplied from the gas mixer so as to dehumidify and dry it and to increase the temperature of the mixed gas, the injection port for injecting the heated hot mixed gas, and a controller capable of regulating the mixing ratio of the hydrogen gas and the nitrogen gas by controlling the respective flow regulators and further comprising a concentration sensor for measuring the concentration of the gas in the vicinity of the subject and a safety circuit for restricting the supply of at least the hydrogen gas, when the value of concentration measured by the concentration sensor exceeds a set value, by controlling the flow regulators by the controller.

13. A soldering apparatus according to claim 12, characterized by comprising a solder guide for feeding thread solder to the soldering iron, and the solder guide also acts as means for injecting the hot mixed gas.

14. A gas injection type soldering apparatus according to claim 12, characterized in that the soldering iron is a contact type soldering iron and comprises a soldering iron main body in which a soldering iron heater is contained, a soldering iron tip for heating and melting solder, the injection port opened so as to surround the entire periphery of the soldering iron tip, and a gas flow path communicating with the injection port and that the temperature of the mixed gas is set to a temperature lower than that of the soldering iron tip when soldering is performed.

15. A soldering apparatus according to claim 12, characterized in that the soldering iron is a non-contact type soldering iron and has the injection port at the extreme end of the soldering iron, and soldering is performed by heating and melting solder by the heat of the mixed gas itself injected from the injection port in the atmosphere of the mixed gas.

16. A gas injection type soldering apparatus according to claim 12, characterized in that the soldering iron is a laser type soldering iron and comprises a soldering iron main body for projecting a laser beam and the injection port also acting as the projection port of the laser beam and that soldering is performed

by projecting the laser beam to a subject in the jet stream of the mixed gas injected from the projection port.